

TEM - TFS Titan Krios G3i: How to Tune the Energy Filter

How to tune the energy filter of the TEM - Thermo Fisher Titan Krios G3i located at the ZMB, Irchel Campus, room Y24-F-11, UZH, Zurich, CH.

Written By: Simona Sorrentino



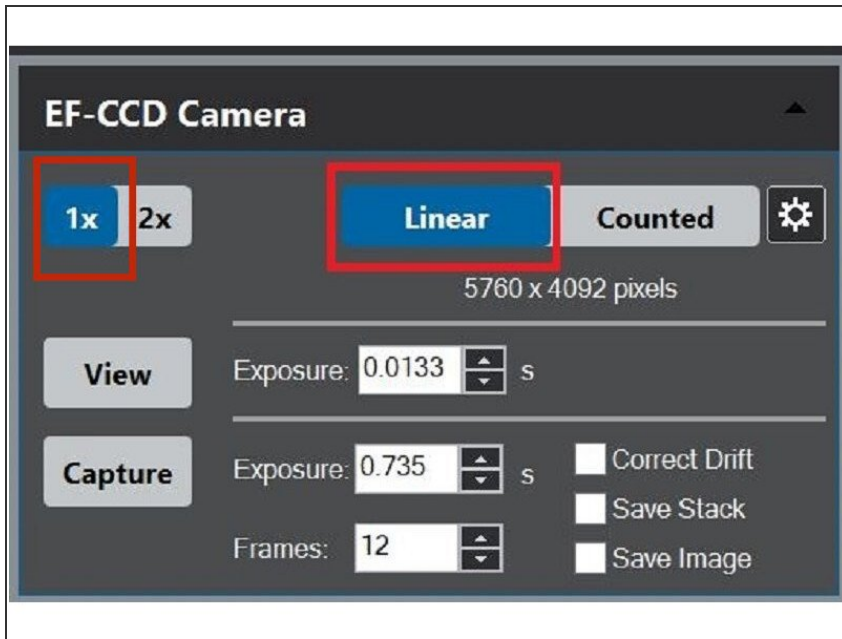
INTRODUCTION

This guide from the Center for Microscopy and Image Analysis, UZH, Zurich, Switzerland shows how tune the BioQuantum energy filter of the K3 Gatan camera, at the transmission electron microscope Titan Krios G3i.

Please find more detailed information about the system [here](#).

To be done once a week after every camera cycle, but also whenever the energy filter is not stable or before the data acquisition of your life.

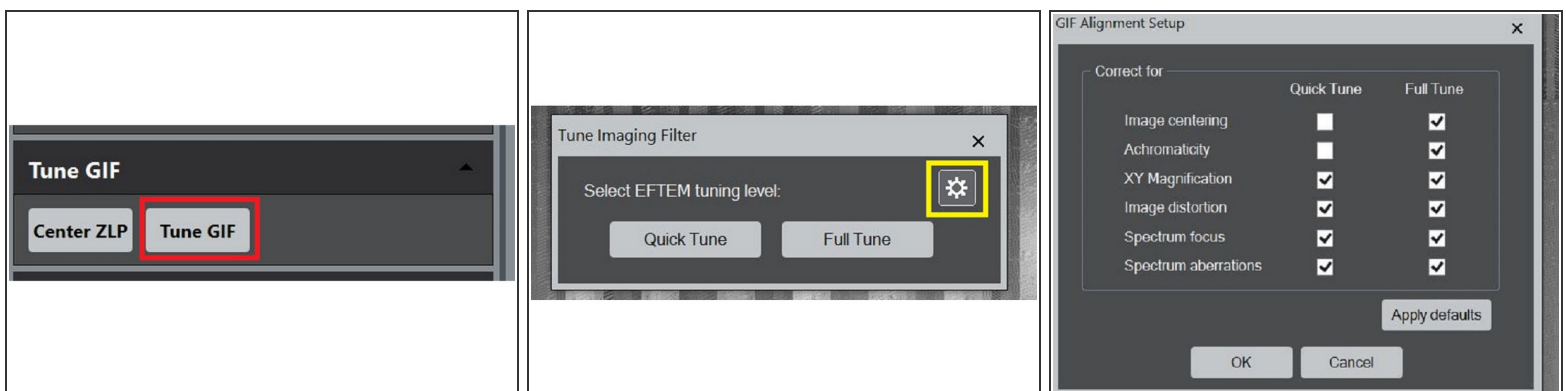
Step 1 — Choose the correct electron dose



- Go to a void area of your grid (broken mesh/void).
- Select the linear mode of the K3 camera and click binning 1x.
- Bring the electron dose to 900 e-/pic/sec. Be sure to use the the same mag you would use for image acquisition. Usually, for such dose rate, you would need to use the C2 aperture of 150 μm , spot size 1 and the illuminated area of around 900 nm.

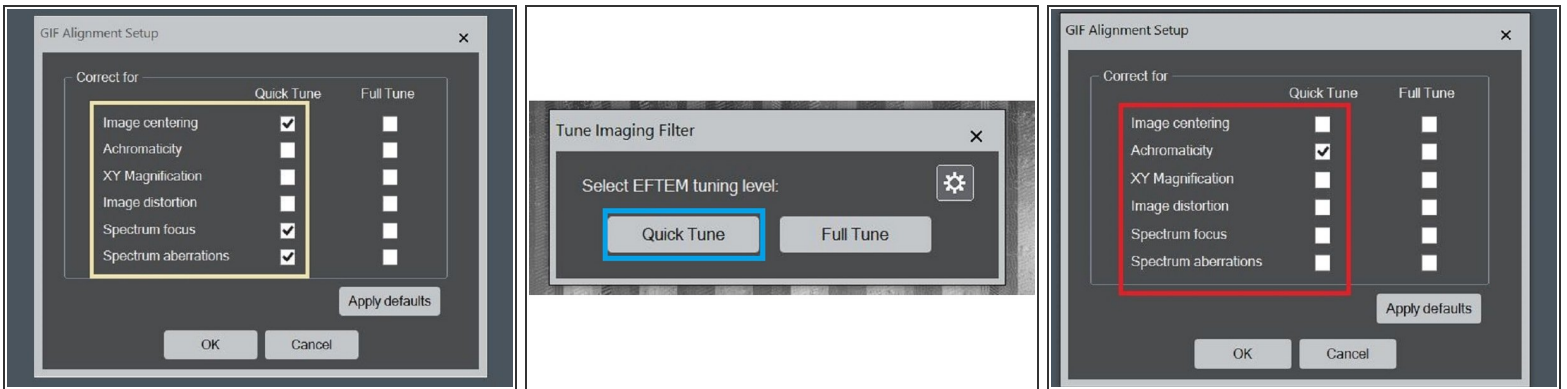
⚠ Be sure to be on the linear imaging mode, otherwise you could burn the K3 camera!!!!

Step 2 — Set up the energy filter tuning



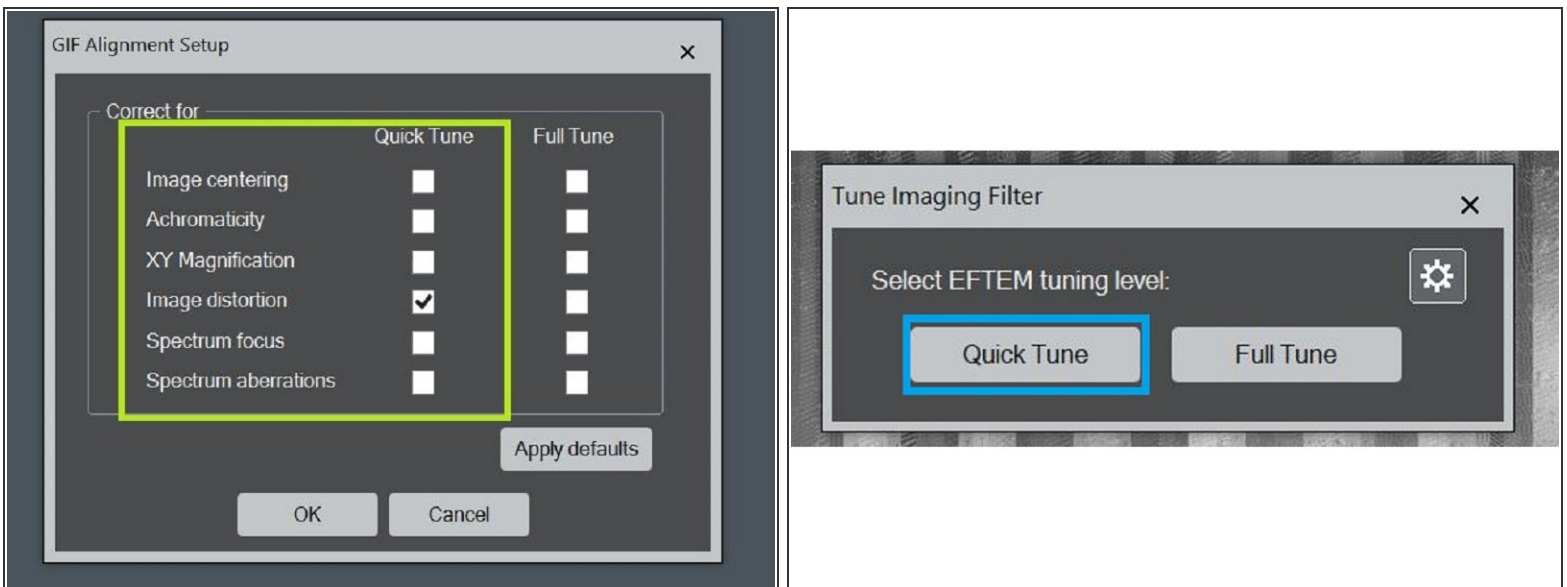
- To tune the Energy Filter Click on "Tune GIF".
- Click on the little wheel to check what the quick and full tune include.
- The GIF alignment setup window will pop up, and you can see what tuning parameters are selected for full and quick tune.

Step 3 — Tune the energy filter



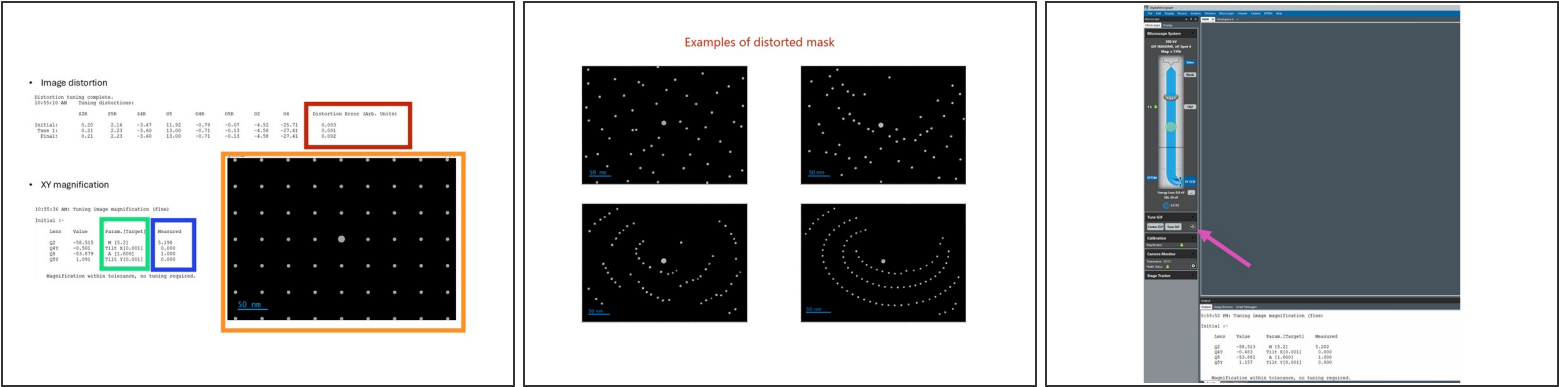
- Select, with the tick in the "Quick Tune" column: Image centering, Spectrum focus and Spectrum aberration, click OK.
- Tune the energy Filer, by clicking "Quick Tune".
- When it is done, reopen the GIF alignment Setup, and select the "Achromaticity", click OK.
- Perform the "Quick Tune".

Step 4 — Perform distortion Tuning



- When it is done, reopen the GIF alignment Setup, and select the "Image Distortion", click OK.
- Perform the "Quick Tune"

Step 5 — Image distortion/magnification tuning - expected outcome and what to do if things go wrong



- Image distortion tuning is followed by image magnification tuning. Examples of expected results of both are shown on the corresponding image: the distortion error should be in the range of 0.001-0.010 (marked in red). The measured values for image magnification (marked in blue) should correspond to target values (marked in green).
- Importantly, both image distortion and magnification tuning use a mask with regularly spaced circular holes (marked in orange). If the pattern of circular holes becomes distorted (for examples please see the next image), the tuning didn't work as expected.
- ❗ In this case, please wait until the tuning is finished and then press "Undo the last tuning" (marked with a pink arrow). Then repeat the tuning by clicking "Quick Tune" again.
- ⚠ Important: If you redo the tuning without undoing the previously unsuccessful tuning, the result will be even worse. In this case please reload the GIB settings (as described in Step 12 of this [guide](#)) and start Tune GIF from scratch.